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PATENT APPLICATION

AF/3746
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q57649

Christian F. M. DUJARRIC

Appln. No.: 09/492,749

Group Art Unit: 3746

Confirmation No.: 1328

Examiner: E. Gartenberg

Filed: January 27, 2000

For: A PROPULSION DEVICE, IN PARTICULAR FOR A ROCKET

#28 / Reply
Brief
12/17/03
Blum

REPLY BRIEF PURSUANT TO 37 C.F.R. § 1.193(b)

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 1.193(b), Appellant respectfully submits this Reply Brief in response to the Examiner's Answer dated October 10, 2003. Entry of this Reply Brief is respectfully requested.

POINTS RAISED IN EXAMINER'S ANSWER

Summary of the Invention

Appellant strenuously objects to the Examiner's allegation that the characteristics of the present invention have been masked, and to the Examiner's statement that Appellant is attempting to water-down the centrality of the fission-based nuclear reactor. While the Examiner chastises Appellant for the summary of the invention, the Examiner never states a different summary of the invention or how to correct what has been provided.

The present invention relates to a propulsion device as recited in independent claim 14, and dependent claims 4-8. These claims, as stated in Appellant's Brief (hereinafter, "the Brief"), recite many features other than a nuclear reactor. Only dependent claim 6 refers to a nuclear core. Accordingly, despite the Examiner's allegation, it is appropriate to summarize the invention in terms of the features recited in all of the claims, particularly those of independent claim 14 that claim 6 depends upon.

Claims Appealed

The Examiner states that a substantially correct copy of the claims appears in the Brief, indicating that the December 10, 2001 Amendment only streamlined the claim language, without affecting any of the claims. Appellant is unclear as to the Examiner's point in this statement. Several Office Actions, including January 17, 2002, July 29, 2002, and February 19, 2003, have been issued since the December 10, 2001 Amendment, where apparently these claims, including their amendments have been examined. As such, Appellant submits that the copy of the claims in the Brief is correct.

Grounds of Rejection

Appellant recognizes that the Grounds of Rejection are the same arguments that the Examiner has brought forth in past Office Actions. Appellant's response to each ground of rejection is fully addressed in the Brief.

Examiner's Response to Argument

The Examiner again states his strong views that the present invention is against public policy under 35 U.S.C. § 101. Appellant disagrees with the 35 U.S.C. § 101 rejection for the reasons detailed in the Brief. Further, public policy does not bar, and actually supports, the invention recited in claim 6. The Examiner's 35 U.S.C. § 101 rejection is based on use of a space nuclear reactor, rather than the limitations of the claims as a whole. None of claims 4-8 and 14 are directed solely to a nuclear core and only dependent claim 6 recites a nuclear core as one limitation of the propulsion device. Each of these arguments are fully supported in the Brief.

Further, Appellant notes that the USPTO has already granted a Patent related to space propulsion nuclear power. For example, U.S. Patent No. 5,873,239 titled "Nuclear Rocket Engine Incorporating a Heat Exchange." Appellant notes with interest that the '239 Patent was examined by one of the conferees of the Examiner's Answer. The present invention, which is not aimed at providing a new nuclear core design, does not add any risk relative to other inventions previously patented in the United States which recite nuclear core designs for space propulsion.

In the Examiner's Answer, Appellant respectfully notes that there is an attempt to "dramatize" the features of the present invention with a reference to Chernobyl and to an atomic/fission bomb. Appellant submits that Chernobyl pollution was created by the dispersion of the contents of a nuclear core which had been in operation long before the accident. Non-natural, highly radioactive elements like Plutonium and Caesium isotopes are created after a

certain time of operation. In the case of an escape trajectory of a rocket engine, there is no need for starting the nuclear reactor beforehand.

Moreover, the "atomic bomb" scenario put forth by the Examiner does not withstand logical analysis. Nuclear material cannot be dispersed in the air by the destruction of the carrier launcher, and a sufficient amount of nuclear material cannot at the same time be concentrated at an extremely high pressure to ignite a nuclear chain reaction.

Finally, MPEP paragraph 706.03(b), citing the Atomic Energy Act of 1954, provides that an invention involving atomic energy is considered as nonstatutory if it is useful solely in the utilization of special nuclear material or atomic energy in an atomic weapon. For the many reasons detailed in the Brief, and Appellant's further comments here, the present invention does not fall into this category.

Regarding enablement, Appellant respectfully submits that the Examiner's rejections have been based on the assertion that the specification is not enabled. Appellant has consistently reminded the Examiner that the legal threshold that is required to be met is that the claims need to be enabled by the specification. The Examiner, neither in his Answer, nor Office Actions has provided a legally appropriate rejection under 35 U.S.C. § 112, first paragraph.

Further, the Examiner states that Appellant is hiding behind unsubstantiated claims that others either know how to make and use it (referring to a rocket motor with a nuclear core) or are of the opinion that it can be done. First, Appellant again submits that the Examiner's Answer, like the rejections in the Office Action is only loosely, if at all, tied to the limitations in the claims. Further, Appellant has provided a *lengthy and detailed explanation* as to enablement of

the features of the claims. While Appellant respects the Examiner's position as being of one of ordinary skill in the art, Appellant is not in agreement with the Examiner as to the level of knowledge of an ordinary artisan in this case.

In addition, the statement that "the prohibitive weight of power reactors and the associated safety devices makes them unsuitable for flight applications" is not shared by the national organizations investing in, and by the specialists working on, nuclear space propulsion topics, in particular in view of the current Prometheus program in this country.

Since the object of the invention is not to recite a new design or a nuclear core producing heat as part of a nuclear rocket, the nuclear core used in the invention is state of the art and in particular, enabled by numerous patents on the subject, some of which have already been discussed in Appellant's previous responses.

Appellant also respectfully submits that there is no need to justify in such a context the mass budget adequacy of a spacecraft equipped with the rocket propulsion device. The notion of weight has no meaning in space. Weight of a celestial body surface depends on the celestial body gravity acceleration. When used in space, an engine can be very useful even if its thrust is lower than its mass multiplied by the Earth gravity acceleration. For example, electric propulsion systems deliver a thrust, which is usually measured in milliNewtons, whereas the electric propulsion system total weight is usually measured in kilograms. Still, the electric thrusters are more and more used on satellites due to their very high specific impulse. So, Appellant submits that the comparison between weight and thrust is essentially meaningless. The electric propelled probes and satellites, which are presently flying, just demonstrate that this

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aspect is irrelevant and is by no means the "crux" of the problem as argued by the Examiner. In addition, solely for the sake of the Examiner's information, the NERVA-derived flight nuclear rocket engines were estimated to have a thrust to mass ratio of the order of 25 to 30 Newton/kg, including the radiation shield.

The Examiner's Answer refers to the features in claim 14 of "at least one loop" and "induction heating." As such, the Examiner appears to be providing new arguments for the rejection under 35 U.S.C. § 102(b). In general, the Examiner's rejection of the claims under 35 U.S.C. § 102(b) rely upon features of claim 14 being "inherent" in the Curtiss reference. Appellant disagrees with the Examiner's conclusion of "inherency" for the reasons detailed in the Brief and as discussed below. Further, the Examiner has not provided a rejection based on all of the limitations of the claim. For example, the Brief discusses that Curtiss does not disclose a nozzle downstream of the coil, which is not addressed by the Examiner.

With regards to Curtiss, the Examiner still tries to ignore that the propulsion force sought and used by Curtiss is a Lorentz force. Contrary to the Examiner's assertions, Appellant's claimed invention cannot look like the Curtiss engine because the present invention generates added thrust by thermal expansion through a thermal expansion nozzle ("diverging section of said nozzle disposed downstream of said inductive coil", as recited), which is a way to generate thrust using the heat energy accumulated at this stage in the gas. Therefore, whatever the number of loops in Appellant's invention, the last loop will always be followed by a thermal expansion nozzle, clearly visible on Appellant's drawings. On the contrary, the Curtiss invention does not need a thermal expansion nozzle, because the thrust is generated through Lorentz

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forces. A thermal expansion nozzle beyond the coils is neither claimed by Curtiss, nor specified, nor visible in its drawings. As a consequence, Curtiss does not use the heat energy (from whatever origin) contained in the gas at the exit of the coils. The thermal energy, if any present at this stage, in the gas is wasted, whereas in Appellant's claimed invention, it is the source of additional thrust. Appellant respectfully submits that the specification and drawings of Curtiss cannot be modified or interpreted at will.

Correction of Typographical Error in Appellant's Brief

Appellant would like to correct for the record a typographical error in the Brief. At page 16, line 13, the recited temperature of "20000K" should read --2000°K--; and at page 16, line 15, the recited temperature of "25000K" should read --2500°K--.

CONCLUSION

For the above reasons as well as the reasons set forth in Appellant's Brief on Appeal, Appellant respectfully requests that the Board reverse the Examiner's rejections of all claims on Appeal. An early and favorable decision on the merits of this Appeal is respectfully requested.

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The Appellant has respectfully requested an Oral Hearing under 37 C.F.R. § 1.194 in a paper filed separately in conjunction with this Brief.

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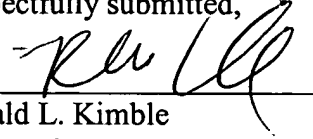
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23373

CUSTOMER NUMBER

Date: December 10, 2003

Respectfully submitted,



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